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(54) **Ski mountaineering kit**

Vorrichtung zum Skibergsteigen

Kit pour ski de randonnée

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WO-A-00/74514 **WO-A-91/16957**
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Description

[0001] The present invention relates to a ski mountaineering kit, in particular, comprising a ski boot and a plate for attachment to the ski.

[0002] Ski mountaineering boots are known to comprise a shell, a sole, and a shank hinged to the shell at the ankle.

[0003] Ski mountaineering calls for boots capable of assuming a downhill position, in which, as with downhill ski boots when skiing downhill, both the toe and heel portions of the boot are clamped to the ski and the shank of the boot is fixed rigidly to the shell, and an uphill or walking position, in which only the toe portion of the boot is clamped and the heel portion is free, i.e. raised off the ski, to enable the ski to be dragged as in cross-country skiing.

[0004] Boots of this sort are normally made, like downhill ski boots, of substantially rigid plastic material, thus limiting the natural bending movement of the foot, particularly at the metatarsus-phalanx articulation, and causing discomfort when walking without skis or uphill with the skis attached.

[0005] Document WO-A-91 16957 discloses a boot and a supporting device, the boot having a shell and which can be used together with a downhill ski clamp assembly comprising a front clamp for the toe and a rear clamp for the heel, the shell comprising a flexible portion extending crosswise to the shell in a region proximate to the ball of the foot; the supporting device being attachable to the ski, behind the front clamp and in a region close to and beneath the flexible portion of the boot.

[0006] Ski mountaineering boots are also known to be made of relatively soft plastic material, which, being flexible, allows a limited bending movement of the foot when walking uphill. Such boots, however, are not rigid enough to maintain the ideal downhill position.

[0007] As a result, none of the plastic ski mountaineering boots currently available provide for optimum performance both up- and downhill.

[0008] It is an object of the present invention to provide a ski mountaineering kit designed to eliminate the aforementioned drawbacks.

[0009] According to the present invention, there is provided a ski mountaineering kit according to claim 1.

[0010] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a ski mountaineering kit, in accordance with the present invention, attached to a ski;

Figure 2 shows a top view in perspective of a detail of the ski mountaineering kit according to the present invention;

Figure 3 shows an exploded view in perspective of the Figure 2 detail;

Figure 4 shows a section along line IV-IV in Figure

2.

[0011] Number 1 in Figure 1 indicates as a whole a ski mountaineering kit comprising a ski mountaineering boot 2 and a supporting device 3 attachable to a ski 4.

[0012] Ski 4 has a ski mountaineering clamp assembly 6 of the type described in Patent EP 0199098, and comprising a front clamp 7 and a rear clamp 8 separated from each other and both fixed rigidly to ski 4.

[0013] Boot 2 substantially comprises a shell 12 made of plastic material; a sole 13; and a shank 14 hinged to shell 12 at the ankle in known manner not shown.

[0014] Shell 12 comprises integrally a toe portion 15 from which extends an end flange 16 having two lateral seats (not shown) cooperating in known manner with front clamp 7 of ski 4 to substantially hinge boot 2 to ski 4 about an axis C; two lateral walls 17 forming a front opening (not shown) closed by a known tongue (not shown); and a heel 18 having a rear seat (not shown) cooperating in known manner with rear clamp 8 to clamp boot 2 to ski 4.

[0015] As shown in Figure 1, in the clamped position, boot 2 is only secured to clamps 7, 8, with sole 13 a given distance off, as opposed to resting on, the ski.

[0016] Shell 12 also comprises a flexible portion 21 extending crosswise with respect to shell 12, from one side to the other of sole 13, and substantially located at the metatarsus-phalanx articulation of the wearer, i.e. close to the toe portion 15 of shell 12, so as to enable the foot to be bent for more comfortable uphill walking when the boot is only attached to front clamp 7.

[0017] More specifically, flexible portion 21 has an undulated contour defined by two grooves 22 separated by a radiused intermediate projection 22a, extends obliquely to follow the natural bend axis of the foot, and has one end, on the inner side of boot 2, located forwards with respect to the other end on the outer side of boot 2.

[0018] Device 3 is attached to ski 4 just behind front clamp 7 (Figure 1) so as to define a support for sole 13 of boot 2, substantially beneath flexible portion 21 of boot 2.

[0019] Supporting device 3 comprises a base plate 25 connectable integrally to ski 4 by means of screws (not shown) engaging respective holes 26; and a top plate 27 fitted in sliding manner to base plate 25. Plates 25 and 27 are conveniently made of material, e.g. plastic material, with as low a friction coefficient as possible, and at any rate lower than the friction coefficient between top plate 27 and sole 13, which is made of elastomeric material.

[0020] Plates 25 and 27 have respective sunken portions facing each other and together defining a shallow, substantially rectangular cavity 28.

[0021] Top plate 27 comprises, on the underside face, a central cylindrical projection 29 engaging in sliding manner a transverse slot 30 in base plate 25, and is secured contacting base plate 25 by a lock washer 34 lo-

cated on the underside of base plate 25 and larger in diameter than the width of slot 30 (Figure 4) so as to cooperate axially with a peripheral edge 36 of the slot.

[0022] The supporting device also comprises a spring 37 housed inside cavity 28 between plates 25 and 27, and in turn comprising an intermediate portion 38 wound about a pin 39 integral with base plate 25, and two arms 40 terminating with respective end portions 41 resting on opposite faces of a central stop projection 42 extending from base plate 25. Pin 39 and projection 42 are located on opposite sides of slot 30, along the longitudinal center line of base plate 25.

[0023] Arms 40 of spring 37 are substantially V-shaped, so as to diverge and then converge with respect to each other, and intersect each other in an undeformed condition (not shown) of spring 37. In the assembly position shown in Figure 3, arms 40 are therefore preloaded against projection 42.

[0024] Top plate 27 also comprises a longitudinal underside rib 35 extending on longitudinally opposite sides of projection 29 and located between arms 40 of spring 37. Arms 40 tend to keep plate 27 centered and aligned with respect to base plate 25 in the absence of external loads; and slot 30 is conveniently defined by two branches 30a, 30b forming an obtuse angle with the vertex facing front clamp 7, so as to define, in use, a stable centered position of projection 29, and therefore of plate 25, by arms 40 interacting elastically with rib 35.

[0025] In actual use, in the uphill position, heel 18 is free; boot 2 is only attached to front clamp 7; and flexible portion 21 allows the foot to bend naturally, particularly when walking without skis.

[0026] In the downhill position, the heel is also clamped, and sole 13 rests on device 3, thus preventing any flexing of flexible portion 21 of boot 2, which is thus rigid and secured rigidly to ski 4.

[0027] In the event of a fall, the low friction coefficient between base plate 25 and top plate 27 allows the two plates to rotate and slide transversely with respect to each other substantially freely, while top plate 27 tends to adhere to sole 13 of the boot. Consequently, as opposed to being transmitted to ski 4, any anomalous stress which might injure the user is transmitted by friction via device 3 from boot 2 to front clamp 7, thus releasing the clamp.

[0028] The advantages of the boot according to the present invention will be clear from the foregoing description.

[0029] In particular, using a ski mountaineering kit comprising a boot with a flexible portion at the metatarsus-phalanx articulation of the user, and a supporting device attachable to the ski at the flexible portion, the boot provides for optimum performance both down- and uphill, by performing as though it were rigid and attached rigidly to the ski in the downhill position, and flexing and so assuming a more comfortable uphill position when released from the rear clamp. The boot is also more comfortable for walking in.

[0030] Moreover, by virtue of device 3 comprising a base plate 25 connected integrally to the ski, and a top plate 27 movable with respect to the base plate, device 3, even when used together with an elastomeric sole, in no way impairs the safety of clamp assembly 6.

[0031] Clearly, changes may be made to ski mountaineering kit 1 as described herein without, however, departing from the scope of the accompanying Claims.

Claims

1. A ski mountaineering kit (1) comprising a ski mountaineering boot (2) having a shell (12) made of plastic material and which can be used together with a ski mountaineering clamp assembly (6) comprising a front clamp (7) for the toe (15) of said boot (2), and a rear clamp (8) for the heel (18) of said boot (2); said toe (15) having two front lateral seats adapted to cooperate with the front clamp (7) to define a hinge about an axis (C) to allow uphill walking when the boot (2) is only attached to the front clamp; said shell (12) comprising a flexible portion (21) extending crosswise to the shell, close to said toe and at the metatarsus-phalanx articulation;
said kit comprising a supporting device (3) attachable to the ski (4), behind and close to the front clamp (7), so as to be located, in use, beneath said flexible portion (21) to prevent deformation of the flexible portion when the boot (2) is secured to both said clamps (7, 8).
2. A ski mountaineering kit as claimed in Claim 1, **characterized in that** said device (3) comprises a base plate (25) attachable rigidly to said ski (4); and a top plate (27) fitted in sliding manner to said base plate and defining a support for a sole (13) of said boot (2).
3. A ski mountaineering kit as claimed in Claim 2, **characterized in that** the friction coefficient between said plates (25, 27) of said device is less than the friction coefficient between said top plate (27) and said sole (13).
4. A ski mountaineering kit as claimed in Claim 3, **characterized in that** said device (3) comprises elastic return means (37) for keeping said top plate (27) in a centered position with respect to said base plate (25).
5. A ski mountaineering kit as claimed in Claim 4, **characterized in that** said elastic return means (37) comprise a spring (37) located between said plates (25, 27) and having an intermediate portion secured to one of said plates (25, 27), and two flexible arms (40) cooperating on opposite sides with a projection (41) extending from the other of said

plates (25, 27).

6. A ski mountaineering kit as claimed in any one of the foregoing Claims, **characterized in that** said flexible portion (21) of said boot (2) has an undulated contour.

Patentansprüche

1. Vorrichtung zum Ski-Bergsteigen (1) umfassend einen Ski-Bergsteigerschuh (2) mit einer Schale (14) aus einem Kunststoffmaterial, der zusammen mit einer Ski-Bergsteiger-Klemmanordnung (6), die eine vordere Klemme (7) für die Schuhspitze (15) des Schuhs (2) umfasst, und einer hinteren Klemme (8) für den Fersenabschnitt (18) des Schuhs (2) verwendet werden kann, wobei die Schuhspitze (15) zwei vordere, seitliche Sitze hat, die darauf abgestimmt sind, mit der vorderen Klemme (7) zusammen zu wirken, um Gelenk um eine Achse C zu definieren, um das Bergaufgehen zu gestatten, wenn der Schuh (2) nur an der vorderen Klemme befestigt ist, wobei die Schale (12) einen flexiblen Abschnitt (21) umfasst, der sich quer zu der Schale nahe bei der Schuhspitze und bei dem Metatarsus-Phalanx-Gelenk erstreckt;

wobei die Vorrichtung eine Tragevorrichtung (4) umfasst, die an dem Ski (4) hinter und nahe bei der vorderen Klemme (7) zu befestigen ist, so dass sie im Gebrauch unter dem flexiblen Abschnitt (21) liegt, um eine Deformation des flexiblen Abschnitts zu verhindern, wenn der Schuh (2) an beiden Klemmen (7, 8) befestigt ist.

2. Vorrichtung zum Ski-Bergsteigen wie in Anspruch 1 beansprucht, **dadurch gekennzeichnet, dass** die Vorrichtung (3) eine Basisplatte (25), die fest an dem Ski (4) zu befestigen ist, und eine Deckplatte (27) umfasst, die gleitbar an der Basisplatte befestigt ist und eine Unterstützung für eine Sohle (13) des Schuhs (2) bildet.

3. Vorrichtung zum Ski-Bergsteigen wie in Anspruch 2 beansprucht, **dadurch gekennzeichnet, dass** der Reibungskoeffizient zwischen den Platten (25, 27) der Vorrichtung geringer ist als der Reibungskoeffizient zwischen der Deckplatte (27) und der Sohle (13).

4. Vorrichtung zum Ski-Bergsteigen wie in Anspruch 3 beansprucht, **dadurch gekennzeichnet, dass** die Vorrichtung (3) eine elastische Rückholeinrichtung (27) aufweist, um die Deckplatte (27) in einer zentrierten Position in Bezug auf die Basisplatte (25) zu halten.

5. Vorrichtung zum Ski-Bergsteigen wie in Anspruch

4 beansprucht, **dadurch gekennzeichnet, dass** die elastische Rückholeinrichtung (37) eine Feder (37) aufweist, die zwischen den Platten (25, 27) angeordnet ist und die mit einem mittleren Abschnitt an einer der Platten (25, 27) und an zwei flexiblen Armen (40) befestigt ist, die auf gegenüberliegenden Seiten mit einem Vorsprung (41) zusammen wirken, der sich von den anderen Platten (25, 27) weg erstreckt.

6. Vorrichtung zum Ski-Bergsteigen wie in einem der vorhergehenden Ansprüche beansprucht, **dadurch gekennzeichnet, dass** der flexible Abschnitt (21) des Schuhs (2) eine wellige Kontur hat.

Revendications

1. Nécessaire de ski de randonnée (1) comprenant une chaussure de ski de randonnée (2) qui a une coque (12) faite en matière plastique et que l'on peut utiliser en même temps qu'un ensemble de fixation de ski de randonnée (6) qui comprend une mâchoire de fixation avant (7) pour le bout (15) de ladite chaussure (2) et une mâchoire de fixation arrière (8) pour le talon (18) de ladite chaussure (2) ; ledit bout (15) ayant deux sièges d'appui latéraux adaptés pour coopérer avec la mâchoire de fixation avant (7) pour définir une charnière autour d'un axe (C) et permettre la marche en montée quand la chaussure (2) n'est fixée qu'à la mâchoire avant ; ladite coque (12) comprenant une partie flexible (21) qui s'étend transversalement par rapport à la coque, près dudit bout et au niveau de l'articulation métatarse - phalange ;

ledit nécessaire comprenant un dispositif de support (3) qui peut être fixé au ski (4), derrière et près de la mâchoire de fixation avant (7), de sorte à se situer, en cours d'utilisation, sous ladite partie flexible (21) pour empêcher la déformation de la partie flexible quand la chaussure (2) est fixée aux deux mâchoires de fixation (7, 8) susmentionnées.

2. Nécessaire de ski de randonnée selon la revendication 1, **caractérisé en ce que** ledit dispositif (3) comprend une plaque de base (25) que l'on peut fixer rigidement au ski (4) ; et une plaque de dessus (27) engagée de manière à coulisser avec ladite plaque de base et constituant un support pour la semelle (13) de ladite chaussure (2).

3. Nécessaire de ski de randonnée selon la revendication 2, **caractérisé en ce que** le coefficient de frottement entre lesdites plaques (25, 27) dudit dispositif est inférieur au coefficient de frottement entre ladite plaque de dessus (27) et ladite semelle (13).

4. Nécessaire de ski de randonnée selon la revendication

cation 3, **caractérisé en ce que** ledit dispositif (3) comprend des moyens de rappel élastiques (37) pour maintenir ladite plaque de dessus (27) dans une position centrée par rapport à ladite plaque de base (25).

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5. Nécessaire de ski de randonnée selon la revendication 4, **caractérisé en ce que** lesdits moyens de rappel élastiques (37) comprennent un ressort situé entre lesdites plaques (25, 27) et ont une partie intermédiaire fixée à une des dites plaques (25, 27) et deux bras flexibles (40) coopérant, de part et d'autre de celle-ci, avec une saillie (41) qui s'étend à partir de l'autre des dites plaques (25, 27).

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6. Nécessaire de ski de randonnée selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite partie flexible (21) de ladite chaussure (2) a un contour ondulé.

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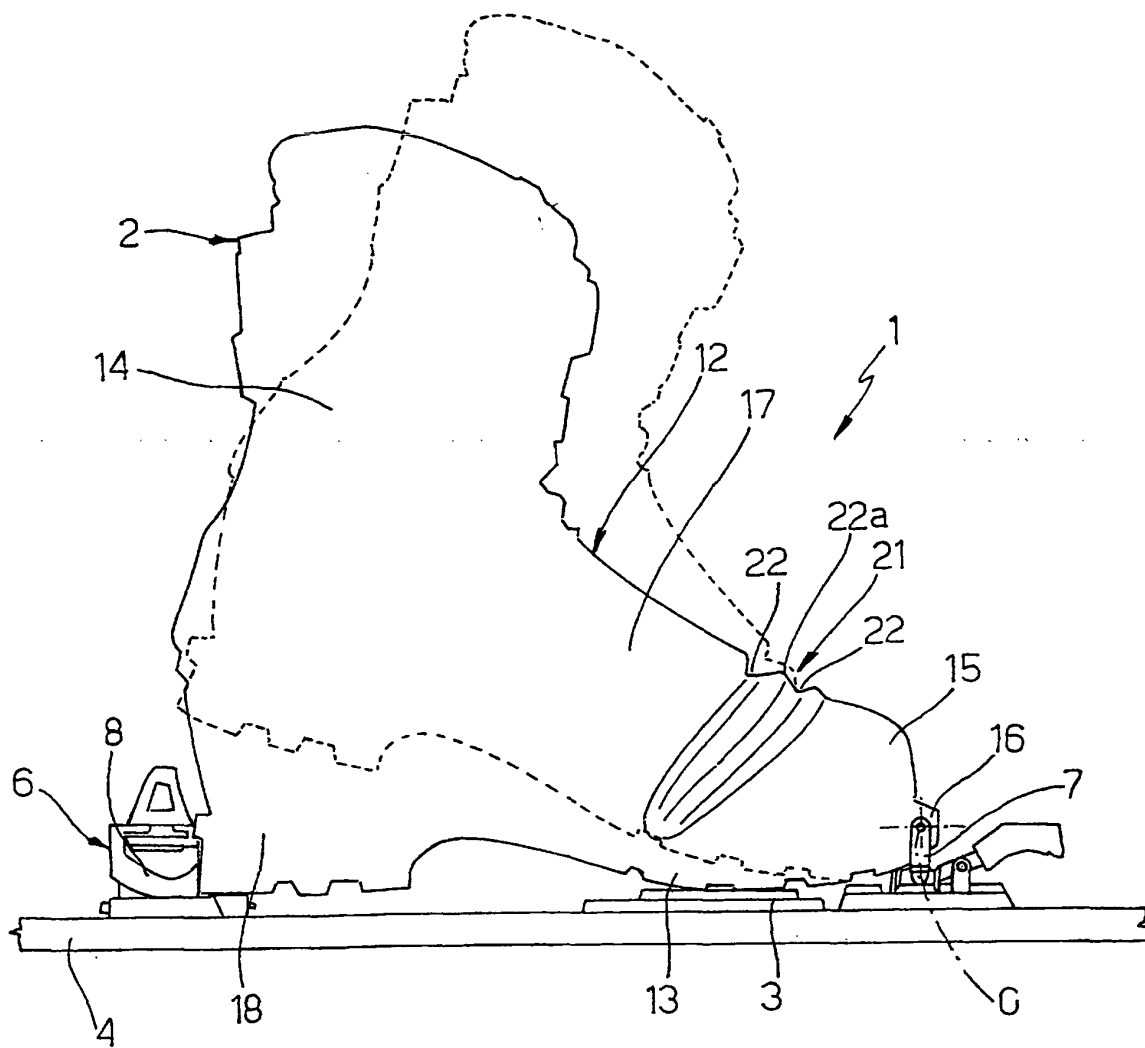


Fig. 1

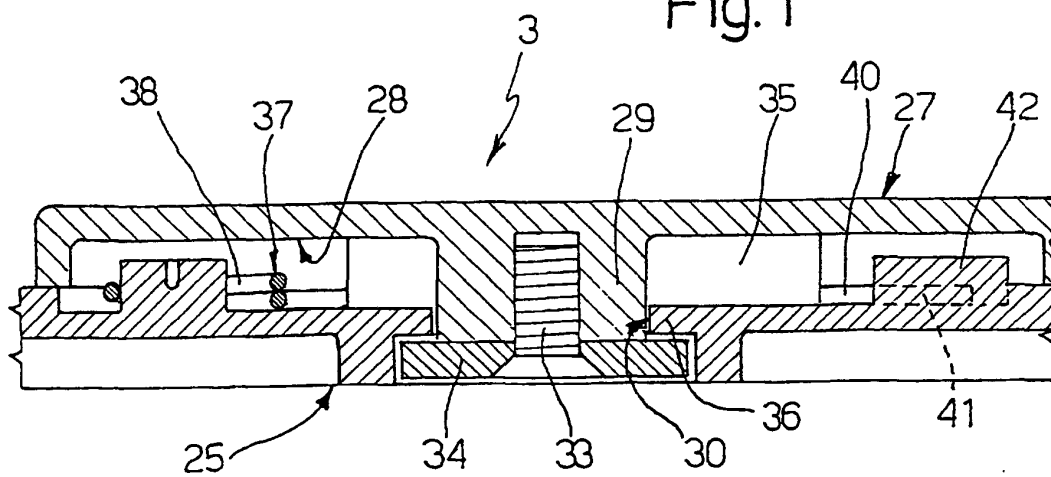


Fig.4

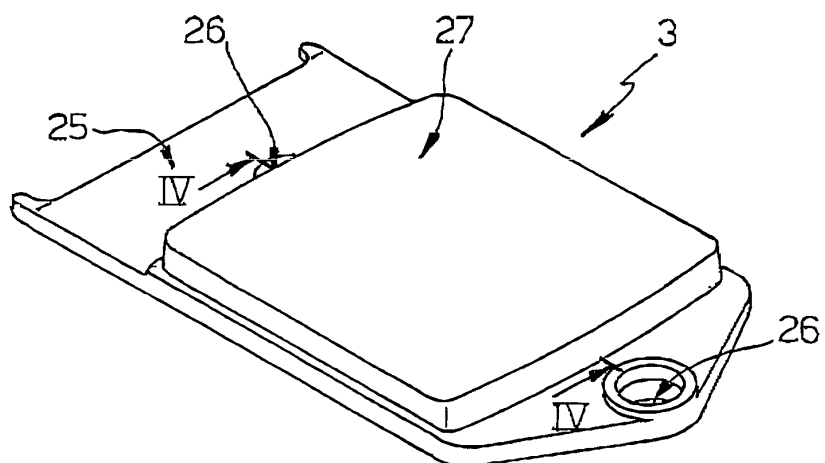


Fig. 2

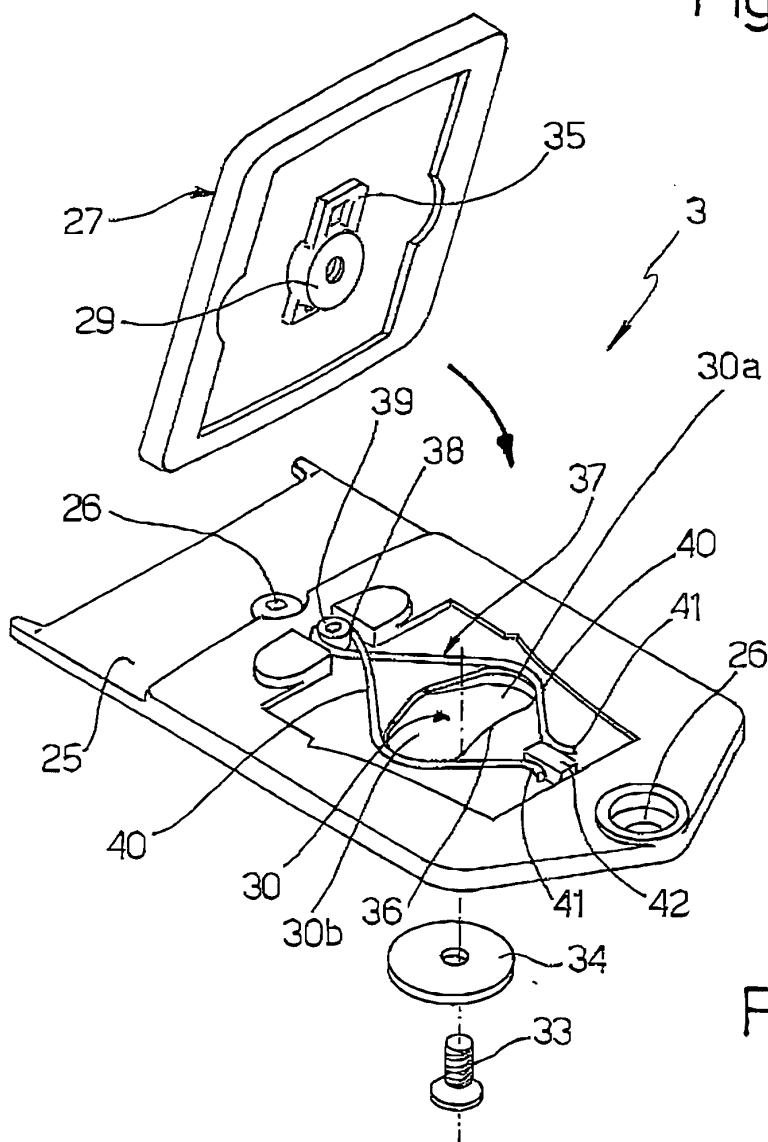


Fig. 3